ABSTRACT

A novel rolling cone rock bit includes a plurality of PDC or other cutters mounted to the leg of the drill bit and positioned to cut the troublesome corner of the bottomhole. The plurality of cutters may be the primary cutting component at gage diameter, or may be redundant to gage teeth on a rolling cutter that cut to gage diameter. Consequently, the occurrence of undergage drilling from the wear and failure of the gage row on a rolling cutter is lessened. Another inventive feature is the inclusion of a mud ramp that creates a large junk slot from the borehole bottom up the drill bit. The resulting pumping action of the drill bit ramp speeds up the removal of chips or drilling cuttings from the bottom of the borehole, reduces the level of hydrostatic pressure at the bottom of the borehole and minimizes the wearing effect of cone inserts regrinding damaging drill cuttings.